During ensuing months it will be important to make as many drawings as possible, and to secure a large number of transits of the various markings. Among others the following may be specially mentioned:

(1) Light and dark spots near the equator (period 9h. 50m. 6s. in 1880, increased to 9h. 50m. 30s. in 1888).

(2) Dark spots on a belt in latitude 25° + (period 9h. 48m. in 1880, increased to about 9h. 49½m. in 1891).

(3) Dark spots and breaks in a very narrow belt in latitude 35° + (period 9h. 55m. 39s. in 1895).

(4) Light and dark spots in the region south of the red spot (period 9h. 55m. 18s., and apparently unchangeable between 1880 and 1891).

In the course of his work, the observer will also detect other features worthy of attention.

From eye-estimated transits the periods of the various objects can be very accurately ascertained, and Mr. Marth's valuable ephemerides for physical observations of Jupiter, published in *Monthly Notices* (June and supplementary numbers, 1895), will assist the student to reduce his own materials. W. F. DENNING.

NOTES.

THE Royal Society's medals have this year been adjudicated by the President and Council as follows:—The Copley Medal to Prof. Karl Weierstrass, For. Mem. R.S., for his investigations in pure mathematics; a Royal Medal to Prof. James Alfred Ewing, F.R.S., for his investigations on magnetic induction in iron and other metals; a Royal Medal to Dr. John Murray, for his services to biological science and oceanography in connection with the *Challenger* reports, and for his original contributions to the same; and the Davy Medal to Prof. William Ramsay, F.R.S., for his share in the discovery of argon, and for his discoveries regarding gaseous constituents of terrestrial minerals. Her Majesty the Queen has been graciously pleased to approve of the award of the Royal Medals. The medals will, as usual, be presented at the anniversary meeting on St. Andrew's day (November 30). The Society will dine together at the Whitehall Rooms on the evening of the same day.

THE following is a list of those who have been recommended by the President and Council of the Royal Society for election into the Council for the year 1896, at the anniversary meeting on November 30:—President: Sir Joseph Lister, Bart. Treasurer: Sir John Evans, K.C.B. Secretaries: Prof. Michael Foster, the Lord Rayleigh. Foreign Secretary: Dr. Edward Frankland. Other members of the Council: Mr. William Crookes, Sir Joseph Fayrer, K.C.S.I., Mr. Lazarus Fletcher, Dr. Walter Holbrook Gaskell, Dr. William Huggins, the Lord Kelvin, Prof. Alexander B. W. Kennedy, Prof. Horace Lamb, Prof. Edwin Ray Lankester, Prof. Charles Lapworth, Major Percy Alexander MacMahon, R.A., Prof. John Henry Poynting, Prof. Arthur William Rücker, Mr. Osbert Salvin, Prof. Harry Marshall Ward, Admiral William James Lloyd Wharton, C.B.

THE Trustees of the British Museum have decided not to fill up for the present the Keepership of Zoology, vacant by Dr. Günther's retirement, but to appoint two additional Assistant-Keepers from the existing staff, so that there will be one for each of the three sections into which the department will be divided for administration purposes, viz. insects, other invertebrates, and vertebrates. Sir William Flower will undertake the principal duties of Keeper of the Department, in addition to those of Director of the Natural History division of the Museum. A junior assistant will be appointed by competition, so as to keep up the numerical strength of the staff of the department. He will probably be attached to the entomological section, which although already the largest, still requires strengthening in order to cope with the arrangement of the vast number of specimens continually being added to the collection.

WE notice the announcement that, on November 20, Mr. Balfour will receive a deputation from the Association of Chambers of Commerce, in reference to the adoption of the metric system. Our readers will remember that this subject has been considered by a Select Committee of the House of Commons, which has recommended that the metric system of weights and measures be at once legalised for all purposes, and, after a lapse of two years, be rendered compulsory by Act of Parliament. The deputation will present to the First Lord of the Treasury memorials which have been prepared by the Association and by the Leeds and other Chambers of Commerce, urging the Government to bring in a Bill next Session for the purpose of carrying out these recommendations. We trust that the need for the reform of our present cumbersome system will be forcibly impressed upon the Government.

A STRONG American Committee is being formed to act with the Huxley Memorial Committee. *Science* states that substantially all the American scientific men who have been thought of as possibly willing to serve have, so far as approached, signified their willingness to do what they can in the matter. The biologists are likely to be well represented, particularly, and the leaders in scientific work in every field will do their full share. It is hoped and anticipated by our contemporary that the contributions from the United States will rival those of Great Britain, and exceed those of any other nation.

THE suggestion put forward by us, a fortnight ago, that the London County Council, or some other public body, should reciprocate the erection of a statue to Newton by the Paris Municipality, has not passed unnoticed in France. We indicated either Laplace or Lavoisier as a suitable subject for a statue in London; but the *Petit Journal*, in commending the idea, suggests that the right person to be honoured is Voltaire, who was an exile in England from 1726 to 1729, and who returned to France a great admirer of Newton. Voltaire was an enthusiastic exponent of Newtonian principles, and it was largely due to his support of them, in scientific and popular writings, that Descartes' vortex theory was rejected by the Paris Academy of Sciences.

The second International Congress of Applied Chemistry will be held in Paris next year. The Congress will be organised in ten sections, under the following heads: (1) Sugar and sugar-refinery; (2) Industries concerned with fermentation; (3) Agricultural industries; (4) Agricultural chemistry; (5) Official and commercial analyses of substances liable to duty; (6) Industrial chemistry; (7) Photography; (8) Metallurgy, mining, and explosives; (9) Biology, medical, pharmaceutical, and hygienic analysis; (10) Electro-chemistry. An International Exhibition of Chemical and Agricultural Industries will be held during the Congress, and for that purpose the Government has given the use of the whole of the Palais de l'Industrie.

A SIGN of advance in Africa comes to us in the shape of an announcement of the establishment of a monthly journal of South African science, arts, and crafts. The *Scientific African* (for that is the name of the new periodical) will contain popular scientific articles, written by experts, on South African animals, plants, rocks, and minerals, and giving information as to the habits, uses, and occurrences of organic and inorganic matter in South Africa and elsewhere. All the industries of South Africa, in the Colony, Transvaal, Free State, Rhodesia, &c., will be described, with photographic illustrations of the interiors of factories, the workings of mines and collieries, bridges, harbour works, special processes in agriculture, and other industries by which the wealth and comfort of South Africa is being enhanced. It is intended to give the latest scientific news, and the columns of the paper will be open to the discussion of scientific matters. The *Scientific African* may thus do good service in collecting and publishing observations on the natural history of Africa, and we extend to it a hearty welcome.

THE death is announced of Dr. P. Bertkau, Professor of Zoology in the University of Bonn; and of Dr. Gustav Wilhelm, Professor of Agriculture in the Technische Hochschule of Gratz.

AT the commencement of this month, a Laboratoire d'Études et de Recherches, connected with the École de Physique et de Chemie industrelles, was opened at Paris. By paying a nominal monthly sum to the Paris Municipal Council, any one desiring to work in the laboratory will have placed at his disposal the materials required for his experiments. On the face of it, this seems an ideal means of furthering scientific research.

THE opening meeting of the new session of the Institution of Civil Engineers was held on Tuesday, in the new premises of the Institution, and Sir Benjamin Baker delivered his presidential address. The Emperor of Germany was elected an honorary member at the same meeting. This brings the number of honorary members up to twenty, out of a total membership of 6730.

A BRILLIANT display of aurora was observed in many parts of the British Islands on Saturday night, the 9th inst., following an exceptionally fine day during the recent unsettled and rainy period. But this temporary improvement was succeeded on Sunday by a barometrical disturbance of considerable intensity which reached our western coasts from the Atlantic, causing strong gales over the kingdom generally, and accompanied with heavy rainfall in the northern and western districts. The barometer fell as low as 28·05 inches in the Hebrides, and the changes of pressure generally were very considerable. The gale was characterised by heavy gusts, and these were at times very violent in the south and west; at Greenwich Observatory, a pressure of 19 lbs. on the square foot was recorded at midnight on the 10th.

THE Quarterly Summary of the *Weekly Weather Report* for July to September last, furnishes valuable means for the comparison of temperature, rainfall, &c., for the summer quarter of the last thirty years, in the principal wheat-producing and grazing districts of the British Islands. The tables show that the highest mean temperature for the three months was 61°·7 in the south of England, and the lowest 55°·4 in the north of Scotland; the mean excess over the whole of the country was 1°. During the last thirty years, the greatest mean excess was 2°·8 in the year 1868, and the greatest deficiency 2°·5 in 1888; there have only been four years with an excess of temperature since 1881. The mean rainfall for the whole of the British Islands during the quarter was 9·1 inches, being a deficiency of 0·3 inch on the average of thirty years. The average fall during this long period was largest in the west of Scotland, 11·8 inches, and lowest in the east of England, 7·5 inches

THE third International Congress of Psychology will be held at Munich, August 4–7, 1896. The International Committee of Organisation is constituted as follows:—President, Prof. Dr. Stumpf; vice-president, Prof. Dr. Lipps; general secretary, Dr. Frhr. von Schrenck-Notzing; and twenty-five members, including, as representatives of British Psychology, Prof. Bain, Prof. Ferrier, Mr. F. W. H. Myers, Prof. Schäfer, Prof. Sidgwick, Prof. Sully, and Dr. Ward. The Congress will be opened on the morning of August 4, 1896, in the great "Aula" of the Royal University. All who desire to further the progress of psychology, and to foster personal relations among the students of psychology in different nations, are invited to take part in the meetings. The following is the provisional programme of work:—Section I. Psychophysiology. (*a*) Anatomy and Physiology of the brain and of the sense-organs (somatic basis of psychical life). Development of nerve-centres; theory of localisation and of neurons, paths of association and structure of the brain. Psychical functions of the central parts; reflexes, automatism, innervation, specific energies. (*b*) Psychophysics. Connection between physical and psychical processes; psychophysical methods; the law of Fechner. Physiology of the senses (muscular and cutaneous sensibility, audition, light-perception, audition colorée); psychical effects of certain agents (medicines). Reaction times. Measurement of vegetative reactions (inspiration, pulse, muscle-fatigue). Section II. Psychology of the normal individual. Scope, methods, and resources of Psychology. Observation and experiment: Psychology of sensations: Sensation and idea, memory and reproduction: Laws of association, fusion of ideas: Consciousness and unconsciousness, attention, habit, expectation, exercise: Perception of space (by sight, by touch, by the other senses); consciousness of depth-dimension, optical illusions. Perception of time. Theory of knowledge. Imagination. Theory of feeling. Feeling and sensation. Sensuous, æsthetic, ethical and logical feeling. Emotions. Laws of feeling: Theory of will. Feeling of willing and voluntary action. Expressive movements. Facts of ethics: Self-consciousness. Development of personality. Individual differences. Hypnotism, theory of suggestion, normal sleep, dreams: Psychical automatism: Suggestion in relation to pædagogics and criminality; pædagogical psychology. Section III. Psychopathology. Heredity in Psychopathology: Statistics: Can acquired qualities be transferred by inheritance? Psychical relations (somatic and psychic heredity), phenomena of degeneration, psychopathic inferiority (insane temperament): Genius and degeneration; moral and social importance of heredity Psychology in relation to criminality and jurisprudence. Functional nerve-disease (hysteria and epilepsy). Alternating consciousness; psychical infection; the pathological side of hypnotism; pathological states of sleep. Psychotherapy and suggestive treatment. Cognate phenomena; mental suggestion, telepathy, transposition of senses; international statistics of hallucinations. Hallucinations and illusions; imperative ideas, aphasia and similar pathological phenomena. Section IV. Comparative Psychology. Moral-statistics. The psychical life of the child. The psychical functions of animals. Ethnographical and anthropological psychology. Comparative psychology of languages; graphology. Forms of application may be obtained from the General Secretary, or from Prof. Sully, East Heath Road, Hampstead, N.W.

THE new quarterly number of the *Journal of the Royal Agricultural Society* (third series, No. 23) is largely occupied with reports of the Society's country meeting, held this year at Darlington. Among the novelties exhibited was a milking machine capable of milking ten cows simultaneously in about twelve minutes. The ingenious part of the apparatus appears to be the teat-cups, which are made of india-rubber of varying thickness, so as to reproduce as nearly as possible the kind of pressure exerted in the operation of hand-milking; a small steam-engine and a vacuum pump are the adjuncts. Papers of scientific interest include one by Prof. Brown, late Director of the Veterinary Department, on "Sheep-Scab in its Relation to Sheep Husbandry," in which the acari of scab are described and illustrated. Sir John Thorold explains the value, as food for calves, of the meat meal which is a by-product in the making of essence of beef. Mr. C. G. Roberts advocates the modification of threshing machines in such a way as to deal with the ears only, thereby avoiding the great waste of power which has been proved to occur when the entire straw is driven—and uselessly driven—through the machine. Dr. E. J. McWeeney contributes an illustrated paper on *Phoma Betæ* (Frank), a fungus that injures mangel. A lengthy paper on village water supplies deals with a subject of increasing importance in rural districts. In the statistical section of the journal it is stated that the wheat crop in Great Britain has this year suffered an unprecedented diminution to the extent of over half a million acres, or 26·5 per cent., and a table is given to show that the wheat area diminished in every county in England, without exception, the greatest decrease being one of 40,890 acres in Lincolnshire.

THE papillary ridges on the hands and feet of monkeys and men form the subject of a paper received from Dr. D. Hepburn, and communicated by him to the Royal Dublin Society, from the *Transactions* of which (vol. v. series ii., 1895) it has been taken. Galton has shown that the great variety in the designs of the patterns among human finger-prints admit of classification under a small number of primary forms. It seemed probable, therefore, that among monkeys the primary forms of the patterns of human finger-prints might be found in conditions sufficiently simple to afford a key to the production of the more elaborate human patterns. With the idea of throwing light upon this point, Dr. Hepburn has prepared and examined a considerable number of impressions from the hands and feet of living Primates. In the chimpanzee and orang-utan, patterns were found similar to those commonly seen in man, whereas among lower monkeys the patterns approximated more closely to those found in the palm or sole. The conclusions arrived at are as follows: (1) The papillary ridges and their intervening furrows are adjuncts to the prehensile function and power of the hands and feet *as well as* arrangements associated with increased sensibility and discrimination of the sense of touch. (2) The eminences on which papillary ridges form designs or patterns are specially developed areas raised above the general level of surrounding parts. They are also special developments in relation to the prehensile function. This accounts for their constancy in the hands and feet of animals which have these organs modified for prehension. (3) The "design" which covers each of these eminences has its character determined by the position, shape, and dimensions of the particular eminence.

AN improved calorimeter, for the application of the method of mixtures in determining specific heats, is described by Mr. F. A. Waterman in the current number of the *Philosophical Magazine*. Mr. Hesehus's ingenious suggestion is acted upon, to maintain the calorimeter, after the introduction of the heated body, at a constant temperature by means of cold water, instead of measuring the rise of temperature of the calorimeter. This arrangement gets rid of the radiation error, and eliminates the "water equivalent" of the vessel. By dropping the cold water in, stirring is also made unnecessary. The method has been placed by Mr. Waterman upon a footing of equality at least with other methods, but his success may be partly due to other improvements. The body experimented upon is heated by a coil of wire conveying a current, and surrounded by ice. The initial temperature of the body may thus be regulated by simply maintaining the current at a certain strength, and this temperature can be kept constant for five or six hours together to within 0°·1 C. The body is then plunged into a silver calorimeter surrounded by the bulb of a delicate air thermometer indicating a difference of temperature of 0°·01 C. The cold water is contained in a copper vessel having the shape of an inverted cone surrounded by ice. In this manner the ice cannot melt away and leave a free space round the vessel. The water-dropping arrangement and the electric heater are mounted on vertical axes in such a manner that they can be quickly swung into position just over the calorimeter. After the heated solid or liquid has been dropped in, the water-dropper is set to work, at first rapidly, and then slowly until the body has assumed the original temperature of the calorimeter. For bodies of the same weight and the same initial temperature, the specific heat is then simply measured by the amount of ice-cold water necessary to cool them to the temperature of the room.

A VERY useful summary of the results so far obtained by the new treatment of diphtheria with antitoxin has just been issued in pamphlet form by Dr. Welch, Professor of Pathology in the Johns Hopkins University, Baltimore. It is reprinted from the *Transactions* of the Association of American Physicians, and is an expansion of an address recently delivered by the author before the Association. Statistics have been carefully collected from all parts of the world, and the reduction in the case mortality for diphtheria by serum treatment is brought out in a very striking manner. Perhaps the best testimonial to the efficacy of the new treatment is furnished by the experience of Baginsky and others, who record the results obtained during an involuntary pause in the serum treatment caused by failure in the supply of serum. Thus Baginsky states that between March 1894 and March 1895, 525 children were treated with antitoxin with a fatality of 15·6 per cent. During the period when the supply of serum was exhausted, 126 children were treated without antitoxin with a fatality of 48·4 per cent. Similarly, Körte noted a rise in fatality from 33·1 per cent. during the serum period to 53·8 when no serum was procurable, and during an epidemic of diphtheria at Trieste the fatality rose from 18·7 per cent. to 50 per cent. when the supply of serum failed. The *Deutsche medicinische Wochenschrift* has instituted a collective investigation of all the cases of diphtheria treated with serum, and the second provisional report was published last August Such statistics should prove of inestimable value in assisting the formation of a correct official judgment of the therapeutic value of the antitoxin; meanwhile, Dr. Welch states that "the study so far of the results of the treatment of over seven thousand cases of diphtheria by antitoxin demonstrates beyond all reasonable doubt that anti-diphtheritic serum is a specific curative agent for diphtheria surpassing in its efficacy all other known methods of treatment for this disease," whilst "the essential harmlessness of the serum has been demonstrated by over a hundred thousand injections."

THE second part of the new ethnological journal, *Ethnoligsches Notizblatt*, has just appeared. Amongst other articles may be noted a short paper on two old carved canoe prows from New Zealand, by Dr. von Luschan, illustrated by a photographic plate. Prof. Grünwedel writes on representations of Gautama from Upper Birmah and other Indian notes. Dr. F. W. K. Müller describes a Japanese picture of the World-Mountain Meru. Some antique clay tablets from Guatemala are described and illustrated by Dr. E. Seler. Prof. W. Grube gives a list of the Chinese gods of the lower classes in Amoy. Some of the specimens collected by Count von Götzen, during his rapid journey across Africa, are described by Dr. Weule; the Count gave the whole of his valuable collection to the Berlin Museum. Under the title of "Anthropological Anniversary" in reference to the twenty-fifth anniversary of the Berlin Anthropological Society, Prof. Bastian gives an eminently characteristic review of anthropological research from his own point of view; he also has a notice on three quipus collected by Dr. Uhle: these are figured. The last half of the journal is occupied with notes and reviews of recent anthropological literature, most of which are signed, and to which Prof. Bastian largely contributes. While dealing with ethnographical matters in a way common to other similar journals, the editorial committee is evidently paying special attention to the philosophical aspects of anthropology, apparently under the guidance of Prof. A. Bastian, and thus the journal will appeal to a wider circle of readers, and tend to advance ethnological studies.

VOL. III. No. 4 of *Contributions from the U.S. National Herbarium* consists of a "Flora of the Sand-hills of Nebraska," by Mr. P. A. Rydberg. The district consists almost entirely of sand-hills formed by the action of the wind, and still constantly altering their configuration from the same cause. The production of soil is only rendered possible by the holding together of the sand by the roots of grasses.

DR. GEORGE KING, F.R.S., Director of the Botanical Survey of India, has forwarded his report for the year 1894-95. Much work has been done during the year in the botanical survey of Northern India by Mr. J. F. Duthie. Mr. G. M. Woodrow has discovered that the tree from which the "date" matting so common in Poona is made, is *Phœnix robusta*, Hook. f.

WE have received, from Messrs. Baillière, Tindall, and Cox, a slender volume, in which is described the Tallerman-Sheffield Hot-Air Bath, with notes on its use in various hospitals. The invention is for the treatment of rheumatism, gout, rheumatic arthritis and similar complaints, by the local application of superheated dry air.

A PAMPHLET entitled "Clouds and Weather," written by Capt. D. Wilson-Barker, and illustrated from twenty-four photographs of clouds taken by him, has just been published at the office of the *Shipping World*. The pamphlet has been prepared for navigators, and is intended to show the interdependence of cloud and weather, so that "they who go down to the sea in ships" may know what relations between the two appear generally to hold good.

AMONG Mr. Murray's announcements of forthcoming works is one entitled "The Great Rift Valley: an Account of a Journey to Mount Kenya and Lake Baringo," by Dr. J. W. Gregory. It will contain a narrative of the journey, and chapters giving some account of the geology and ethnography of the eastern half of British East Africa, and notes on its flora and fauna. One chapter discusses "The Problems of the Distribution of the East African Flora and Fauna." The work will be illustrated by numerous maps and illustrations.

THE current number of the *Journal* of the Chemical Society contains an inset with reference to the Collective Index of the Transactions, Abstracts, and Proceedings, which the Society has determined to publish. The Index will be in two volumes, vol. i. extending from 1873 to 1882, and vol. ii. from 1883 to 1892. Both volumes will be sent to those who have been members of the Society since the end of 1882. Vol. ii. will be sent to Fellows who have joined the Society between January 1, 1883, and December 31, 1892. Fellows who are ineligible to receive gratis copies, and those who neglect to apply for them before the end of this year (or March 1, 1896, for Fellows resident abroad), may obtain them by purchase.

THE ninth edition of Müller-Pouillet's "Lehrbuch der Physik und Meteorologie," enlarged and revised by Dr. L. Pfaundler and Dr. Otto Lummer, is being published in parts by Herren Friedrich Vieweg und Sohn, Brunswick. We have previously announced the publication of several sections of this elaborate work (which, as a whole, makes three volumes, illustrated by no less than two thousand figures), and now notice the issue of the part of the second volume dealing with spectrum analysis, polarisation, double refraction, and the wave-theory of light. The complete second volume will take in both light and heat, but the optical section is itself divided into two parts, published separately, and it is the second of these parts that has just appeared. The treatment of the subject is full, and the value of the text is increased to the student by copious references to optical memoirs, papers, and reports.

WE have on our table several recently-published volumes referring to the proceedings of different learned societies, but limits of space prevent us from giving more than a passing mention of a few of the papers in them. In vol. xxviii. of the *Proceedings* of the Royal Society of New South Wales, Prof. Anderson Stuart's presidential address, and the communications to the Society in the latter half of last year, are printed. Among the papers we notice: "From Number to Quaternion," in which M. G. Fleuri shows how mathematicians may pass quite naturally from the idea of number to that of quaternion; an account of an aboriginal Bora held at Gundabloui in 1894, by Mr. R. H. Mathews; Mr. H. A. Hunt's essay on "Southerly Bursters," which gained the Abercromby prize of £25; the timbers of New South Wales, by Mr. J. V. de Coque; note on Australasian and other stone implements, by Prof. A. Liversidge; and an account of the distribution and collection of current-papers sent adrift to indicate the direction of the coastal currents around Australia, Tasmania, and New Zealand, by Mr. H. C. Russell. The volume contains forty-six plates illustrating the papers in it.

IN the *Mitteilungen* of the Berne Naturforschenden Gesellschaft for 1894 (Nos. 1335-1372), edited by Prof. J. H. Graf, Dr. J. G. Glur has a long paper on the fauna of lake-dwellings; Prof. G. Huber describes shooting-stars and meteorites, and the part these celestial bodies play in the universe, his paper being a good historical account of what is known about them; Dr. F. Stähli discusses the foci of cylinders; Dr. E. Baumberger gives a contribution to the geology of the Bieler Lake; and Dr. C. Wagner gives an analysis of Bessel's function of the first order. The volume containing these papers was received through Messrs. Williams and Norgate, who sent at the same time the *Compte rendu* of the seventy-seventh meeting of the Société Helvétique des Sciences Naturelles, held at Schaffhouse last year, and the *Verhandlungen* containing the reports of committees, and obituary notices of the late Dr. Rudolf Wolf, de Marignac (whose portrait forms a frontispiece), Louis de Coulon and B. Schenk.

THE November number of *Science Progress* contains several very good articles. Prof. W. Stirling contributes to it a detailed account of the life, personality, and work of the great physiologist and teacher, Carl Ludwig, and Dr. Sims Woodhead give a similar notice of Pasteur. Mr. F. H. Neville writes on the chemical nature of alloys and Dr. John Beddoe, F.R.S., on anthropometric research in India, his paper chiefly referring to the investigations made by Mr. H. H. Risley, with Governmental authority and support, into the anthropometry of the Bengal Presidency. One of the inferences which Mr. Risley drew from his investigation was that the castes in India are really ethnological, and not merely social divisions. Referring to a comparison of the size of head in the several provinces, Dr. Beddoe remarks: "Here the brachykephals surpass the dolichos, the Aryans the aborigines, the upper surpass the lower castes. But the Brahmans, despite their claims to be considered a kind of intellectual aristocracy, do not seem to surpass other high-caste men, unless it be in the dimensions of the forehead; and the Kaysaths, or writers, almost all of whom live by their brains and their pens, do not stand very much above the average. The differences are not inconsiderable; they exceed probably those which obtain between the superior and inferior classes in our own country; but I do not think they yield any evidence in support of the inheritance of acquired characters." Other papers in our contemporary are: "The Present State of Floral Biology," by Mr. J. C. Willis, and "Present Knowledge of the Mechanical Testing of Iron and Steel," by Prof. Hudson Beare.

THE additions to the Zoological Society's Gardens during the past week include a Western Slender-billed Cockatoo (*Licmetis pasinator*) from Western Australia, presented by Mrs. Halford Stephens; a Crossed Snake (*Psammophis crucifer*), a Hoary Snake (*Coronella cana*), two Ring-hals Snakes (*Sepedon hæmachtes*) from South Africa, presented by Mr. J. E. Matcham; a Common Wombat (*Phascolomys wombat*), a White-backed Piping Crow (*Gymnorhin leuconota*) from Australia, deposited; two Pennant's Parrakeets (*Platycercus pennanti*) from Australia, purchased; a Rufous Rat Kangaroo (*Hypsiprymnus rufescens*), a Red Kangaroo (*Macropus rufus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE TEMPERATURE OF THE SUN.—Ebert's recent estimate of the solar temperature (NATURE, vol. lii. p. 232), based upon Langley's energy curves for heated solid bodies, is called in question by Dr. Paschen (*Astrophysical Journal*, vol. ii. p. 202). It appears that certain precautions have not been taken in formulating the law derived from experimental data, and that consequently the law does not hold even for the limits of temperature between which direct observations can be made. The chief defects of the former evaluations is that the prismatic energy curves have not been transformed into those for the normal spectrum; and when this is taken into account, the supposition that the wave-length of maximum energy is inversely proportional to the square root of the absolute temperature falls to the ground.

From a series of experiments made with the object of furthering theoretical investigations, Dr. Paschen considers it extremely probable that "the wave-length of the maximum of energy in the spectrum of an absolutely black body is inversely proportional to the absolute temperature." Assuming provisionally as the quantitative results of his observations, wave-length of max. energy × absolute temp. = 2700, and adopting Langley's value of 0μ·5 (μ = ·001 mm.) for the position of maximum energy in the normal solar spectrum, Dr. Paschen finds the solar temperature to be 5400° on the absolute scale, or 5130° C. This means that the sun gives an energy spectrum which is the same as that of an absolutely black body at 5130° C.; and this would be its temperature if its light were entirely a consequence of its heated condition, and if its surface possessed no selective reflection. Attention is drawn to the fact that as our experimental methods are improved, our estimates of the magnitude of the sun's temperature are reduced. Dr. Paschen's value is more than a thousand degrees lower than that of Messrs. Wilson and Gray.

THE DOUBLE STAR OΣ·285.—Dr. See, to whom we are indebted for the revision of the orbits of so many double stars, has lately given us another in the case of OΣ·285 (*Ast. Jour.* No. 356). We are almost tempted to ask whether any practical good results from the premature attempt to determine an orbit where insufficient observations exist, or where the chance errors of observations mask the apparent path of the star. Of course, one very practical value such inquiries may have, especially in the case of a close double star, is to point out the times when observations are likely to prove possible and effective. But the question arises, whether an elaborate interpolation formula or real elliptic elements are dealt with. We are the more concerned to put this question, because Dr. See himself points out that Mr. Gore has, from practically the same observations, given elements strikingly at variance with those to which he has been conducted. The more conspicuous differences between the two sets of elements are shown below.

	Gore (1845-1892).	See (1845-1895).
Period	118·57 years	76·67 years
Excentricity	0·58 ,,	0·470 ,,
Node	106°·58′ ,,	62°·2 ,,
Inclination	45·42 ,,	41·95 ,,

The difficulty of deciding which of the two orbits is the more probable representation of the motion is increased by the fact, that the position angle computed from both is very similar. Previous to 1865 and subsequent to 1887 (in the interval 1865–87, the observations were very uncertain, owing to the close approach of the components) the position angles computed from the two orbits for the same date are rarely separated by a degree, while occasionally the observations differ from the computed place by as much as ten degrees. Dr. See gives an ephemeris for the next five years, and if trustworthy observations can be made of stars separated by about 0″·3, additional light will be thrown on the motion of this interesting pair.

THE SPECTRUM OF α AQUILÆ.—The fact that the lines in the spectrum of α Aquilæ are much broader than the corresponding lines in the majority of stellar spectra, was first noticed by Prof. Pickering, who suggested that this appearance might be due to a very rapid rotation of the star. Photographs taken at Kensington and Potsdam have also shown this haziness of the lines.

The spectrum of this star has formed the subject of a somewhat extended research by M. Deslandres at the Paris Observatory, and by the use of a comparison spectrum enabling him to determine the velocity in the line of sight, he has obtained results of great interest (*Comptes rendus*, Nov. 4, p. 629). He finds that very frequently there are fine double bright lines running through the middle of the dark lines of hydrogen, and even sometimes through those of iron and calcium; the brightness of these lines varies with respect to the general intensity of the spectrum, and M. Deslandres attributes them to the chromosphere of the star.

Measurements of the radial velocity are given for fifty-six dates, and they clearly indicate periodic but complex variations. The maximum velocity of approach with respect to the sun was 38·4 km. per second on September 19, 1892, and of recession 11·4 km. per second on July 25, 1895. There appears to be a great oscillation with a maximum velocity every forty-three days, and superposed on this are one or more secondary oscillations, one of which has probably a period of about five days. M. Deslandres believes his results to indicate that Altaïr is at least a spectroscopic triple star; but he states that for a more complete knowledge of the phenomena, better apparatus and a less variable sky than that of Paris will be necessary.

β Ursæ Minoris also exhibits rapid fluctuations of velocity, and M. Deslandres' results in connection with this star will form the subject of a future paper.

VARIABILITY OF RED STARS.—In the current number of *Knowledge*, Dr. Brester gives a general account of his theory as to the cause of variability in red stars (see NATURE, vol. xxxix. p. 492), and extends it a step in order to account for the appearance of bright lines. It is assumed that the stars in question are cooling bodies, and that the atmospheres are sufficiently cooled down to permit the existence of chemical compounds. When some of the vapours are cooled to the dew point, they will condense in obscuring clouds, and produce a minimum without any reduction of temperature. In addition to saturated vapours, if we follow Dr. Brester, the atmospheres will also contain molecules of dissociated matter, which will only combine after the condensation of the saturated vapours has rendered the mixture sufficiently concentrated. The combination of the dissociated molecules produces heat enough to vapourise the clouds, and the maximum is restored by the opening to view of the constantly glowing interior. The presence of bright lines in the spectrum of a variable star near maximum is ascribed to "luminescence" produced by the chemical combination of the dissociated molecules. Thus, the bright lines at the maximum, according to Dr. Brester, are not the effect of heat, but rather of cooling. Dr. Brester finds some justification for this supposed origin of bright lines in the fact that carbon bisulphide gives a discontinuous spectrum at no higher a temperature than 150°; but it must be remembered that the bright lines in question are usually those of hydrogen, and there is no experimental demonstration that these lines can be produced except at a high temperature. To us it seems easier to regard the bright lines of hydrogen as being produced by true elevations of temperature about the time of maximum, such as are explained by the meteoritic hypothesis.

TYPHOID FEVER EPIDEMICS IN AMERICA.

THE factors which control the dissemination of disease are so numerous, and in many cases so complicated, that it is often only after long and patient searching that an epidemic is successfully tracked to the original nidus from which it has sprung.

By the careful record of data of this description, compiled with accuracy and care, we shall gradually become possessed of trustworthy material out of which an historical survey may be built up, and the task of deciphering the course and conduct of epidemic diseases materially lightened.